DETAILED ACTION

1.   This Office Action incorporates an <u>Examiner's Amendment</u> and <u>Reasons For</u>
<u>Allowance</u>.

2.   A request for continued examination under 37 CFR 1.114, including the fee set
forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this
application is eligible for continued examination under 37 CFR 1.114, and the fee set
forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action
has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on
4/13/2009 has been entered.

3.   The Applicant's response to the last Office Action, filed 4/13/2009 has been
entered and made of record.

4.   The Applicant has canceled claim(s) 4, 6, 8, 24, 28, 31, 33, 35, and 55.

5.   The Applicant has included newly added claim(s) 92-93.

6.   The application has pending claim(s) 1-3, 5, 7, 9-14, 29-30, 32, 34, 36-41, 51,
56-57 and 92-93 [claims 15-23, 25-27, 42-50, 52-54, 69-77, and 79-81 remain
withdrawn].

7.   In response to the Request for Continued Examination filed on 4/13/2009:

The "Claim rejections under 35 U.S.C. 112, second paragraph" have been entered and therefore the Examiner withdraws the rejections under 35 U.S.C. 112, second paragraph.

8.   Applicant's arguments, see "CLAIM REJECTIONS 35 U.S.C. 103 ..." in pages 22-25, filed 4/13/2009, with respect to claims 1-3, 5, 7, 9-14, 29-30, 32, 34, 36-41, 51, and 56-57 [and newly added claims 92-93] have been fully considered and are persuasive. The 35 U.S.C. 103 rejection of claims 1-3, 5, 7, 9-14, 29-30, 32, 34, 36-41, 51, and 56-57 [and newly added claims 92-93 respectively] has been withdrawn.

EXAMINER'S AMENDMENT

9.   An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Richard Brian Leggett (Reg. No. 59,485) on 6/12/2009.

The application has been amended as follows:

For the claims on pages 2-21 of the Applicant's RCE dated 4/13/2009:

1. Please further amend claims 1, 3, 9, 15-23, 25-27, 42-54, 56-57, 69-77, 79-81, and 92-93 as shown by the attached pages.

1.   (Currently Amended) A method, comprising:

encoding, by a computing system, each of a collection of coefficients of source data according to a global coding order and an overall target bit rate;

calculating, by the computing system, for a current one of a plurality of coding units of a particular one of the collections of coefficients, an adaptive threshold,

   wherein said calculating comprises determining a fractional number, wherein said fractional number comprises a denominator derived from at least a relationship between the overall target bit rate and a total amount of bits used to encode previously-encoded coding units of the source data according to at least the global coding order, and

   wherein said fractional number comprises a numerator equal to an amount of distortion that would be caused by terminating said encoding of the particular one of the collections of coefficients at the current coding unit or by ~~truncating~~ terminating said encoding of the particular one of the collections of coefficients at a neighboring coding unit of the current coding unit; and

terminating, by the computing system, said encoding of the particular one of the collections of coefficients upon determining that a rate-distortion value of the current one of the plurality of coding units is less than the calculated adaptive threshold of the current coding unit.

3.   (Currently Amended) The method of claim 1, further comprising
calculating, by the computing system, the rate-distortion value, wherein the rate-
distortion value comprises a rate value and a distortion value, wherein the rate value
comprises an amount of bits to encode the ~~particular~~ current coding unit, or a first
neighboring coding unit according to a local coding order of the particular collection of
coefficients, and wherein the distortion value comprises a distortion reduction due to an
including of the coding unit in the output code-stream, or a distortion reduction due to an
including of a second neighboring coding unit according to the local coding order of the
collection of coefficients.

9.   (Currently Amended) The method of claim 1, wherein said calculating of
the adaptive threshold comprises calculating a product of the fractional number and a
weighting factor.

15-23. (Canceled)

25-27. (Canceled)

42-54. (Canceled)

56.   (Currently Amended) The apparatus as claimed in claim 93, wherein said
collections of coefficients of the source data comprise code-blocks.

57.   (Currently Amended) The apparatus as claimed in claim 93, wherein the rate-distortion value comprises a rate value and a distortion value, wherein the rate value comprises an amount of bits to encode the ~~particular~~ current coding unit, or a first neighboring coding unit, according to the coding order, and wherein the distortion value comprises a measure of distortion reduction due to the current coding unit of the collection of coefficients, or a measure of distortion reduction due to a second neighboring coding unit of the current coding unit.

69-77. (Canceled)

79-81. (Canceled)

92.   (Currently Amended) An article of manufacture including a computer-readable medium having instructions stored thereon that, if executed by a computing device, cause the computing device to perform a method comprising:

encoding each of a collections of coefficient of source data according to a coding order and an overall target bit rate;

calculating for a current one of a plurality of coding units of a particular one of the collections of coefficients, an adaptive threshold,

wherein said calculating comprises determining a fractional number, wherein said fractional number comprises a denominator derived

from at least a relationship between the overall target bit rate and a total

amount of bits used to encode all previously-encoded coding units of the

source data according to at least the coding order, and

wherein said fractional number comprises a numerator equal to an

amount of distortion that would be caused by terminating said encoding of

the particular one of the collections of coefficients at the current coding

unit or by ~~truncating~~ terminating said encoding of the particular one of the

collections of coefficients at a neighboring coding unit of the current

coding unit; and

terminating said encoding of the particular one of the collections of coefficients

upon determining that a rate-distortion value of the current one of the plurality of coding

units is less than the calculated adaptive threshold of the current coding unit.

93.   (Currently Amended) An apparatus, comprising:

means for encoding each of a collection of coefficients of source data, in turn,

according to a coding order and an overall target bit rate;

means for calculating for a current one of a plurality of coding units of a particular

one of the collections of coefficients, an adaptive threshold,

wherein the adaptive threshold comprises a fractional number,

wherein said fractional number comprises a denominator derived from at

least a relationship between the overall target bit rate and a total amount

of bits used to encode all previously-encoded coding units of the source

data according to at least the coding order, and

wherein said fractional number comprises a numerator equal to an

amount of distortion that would be caused by terminating said encoding of

the particular one of the collections of coefficients at the current coding

unit or by ~~truncating~~ terminating said encoding of the particular one of the

collections of coefficients at a neighboring coding unit of the current

coding unit; and

means for terminating encoding of the particular one of the collections of

coefficients upon determining that a rate-distortion value of the current one of the

plurality of coding units is less than the calculated adaptive threshold of the current

coding unit.

REASONS FOR ALLOWANCE

10.   The following is an examiner's statement of reasons for allowance:

Claims 1-3, 5, 7, 9-14, 29-30, 32, 34, 36-41, 56-57 and 92-93 (now renumbered

as 1-25, for issue) are allowed.

Independent claim 1 (now renumbered as 1, for issue) respectively recites the

limitations of: calculating, by the computing system, for a current one of a plurality of

coding units of a particular one of the collections of coefficients, an adaptive threshold,

wherein said calculating comprises determining a fractional number, wherein said

fractional number comprises a denominator derived from at least a relationship between

the overall target bit rate and a total amount of bits used to encode previously-encoded

coding units of the source data according to at least the global coding order, and

wherein said fractional number comprises a numerator equal to an amount of distortion

that would be caused by terminating said encoding of the particular one of the

collections of coefficients at the current coding unit or by terminating said encoding of

the particular one of the collections of coefficients at a neighboring coding unit of the

current coding unit; and terminating, by the computing system, said encoding of the

particular one of the collections of coefficients upon determining that a rate-distortion

value of the current one of the plurality of coding units is less than the calculated

adaptive threshold of the current coding unit. Independent claims 92 and 93 (now

renumbered as 12 and 23, for issue) recite similar limitations respectively.

The combination of these features as cited in the claims in combination with the other limitations of the claims are neither disclosed nor suggested by the prior art of record.

The closest reference Taubman ("High Performance Scalable Image Compression with EBCOT" – 2000, as applied in previous Office Action) discloses image compression based on independent embedded block coding with optimized truncation of the embedded bit-streams using rate-distortion. However, Taubman does not teach the limitations cited above.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

11.   Any inquiry concerning this communication or earlier communications from the examiner should be directed to Bernard Krasnic whose telephone number is (571) 270-1357. The examiner can normally be reached on Mon-Thur 8:00am-4:00pm and every other Friday 8:00am-3:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bhavesh Mehta can be reached on (571) 272-7453. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the

Patent Application Information Retrieval (PAIR) system. Status information for

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you have questions on access to the Private PAIR system, contact the Electronic

Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a

USPTO Customer Service Representative or access to the automated information

system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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